

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2003-041162

(43)Date of publication of application : 13.02.2003

(51)Int.Cl.

C09D 11/00  
B41J 2/01  
B41M 5/00  
C09B 29/36  
C09B 29/48

(21)Application number : 2001-224806

(71)Applicant : FUJI PHOTO FILM CO LTD

(22)Date of filing : 25.07.2001

(72)Inventor : NISHIDA NOBUHIRO  
FUJIWARA TOSHIKI

### (54) INK COMPOSITION

#### (57)Abstract:

PROBLEM TO BE SOLVED: To provide an ink composition for ink-jet printing use, having both high jetting stability and intermittent jetting stability, giving prints of improved quality, hue and weatherability and showing high drying rate of ink on printed paper, and to provide an ink-jet printing method capable of giving such high- quality prints based on both the high jetting stability and intermittently jetting stability of the ink composition.

SOLUTION: This ink composition is such that a dye with a specific structure is dissolved or dispersed in an aqueous medium, including a water-miscible organic solvent as well. The other objective ink-jet printing method involves using the ink composition.

### LEGAL STATUS

[Date of request for examination] 13.09.2005

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's  
decision of rejection]

[Date of requesting appeal against examiner's  
decision of rejection]

[Date of extinction of right]

## \* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

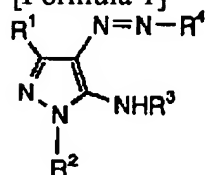
## CLAIMS

## [Claim(s)]

[Claim 1] The following general formula (1) Ink constituent characterized by containing at least one sort chosen from the water soluble dye expressed with - (3), and at least one sort of water-soluble organic solvents.

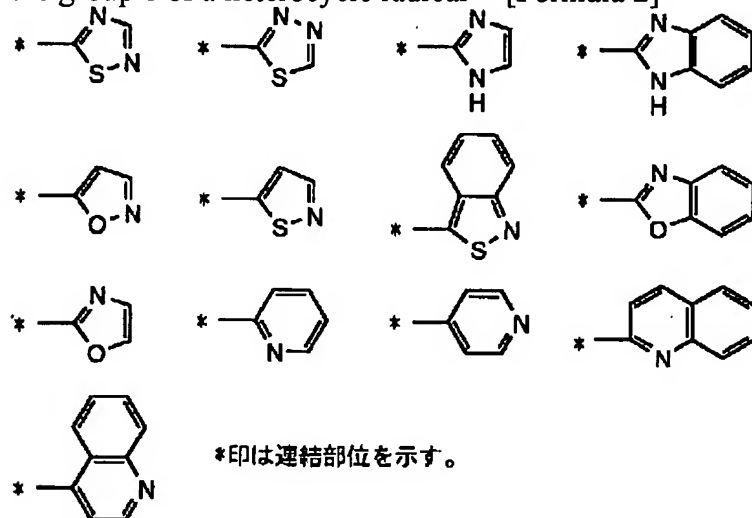
General formula (1)

[Formula 1]



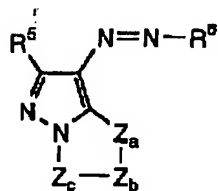
(R1, R2, and R3 express a hydrogen atom, a halogen atom, a cyano group, an alkyl group, a cycloalkyl radical, an aralkyl radical, an aryl group, an alkylthio group, an arylthio radical, or an ionicity hydrophilic radical independently respectively among a general formula (1).) R4 expresses the heterocycle radical which is chosen from the group 1 of the following heterocycle radical and which may be permuted. However, the water soluble dye expressed with a general formula (1) has at least one ionicity hydrophilic radical in a molecule.

the group 1 of a heterocycle radical -- [Formula 2]



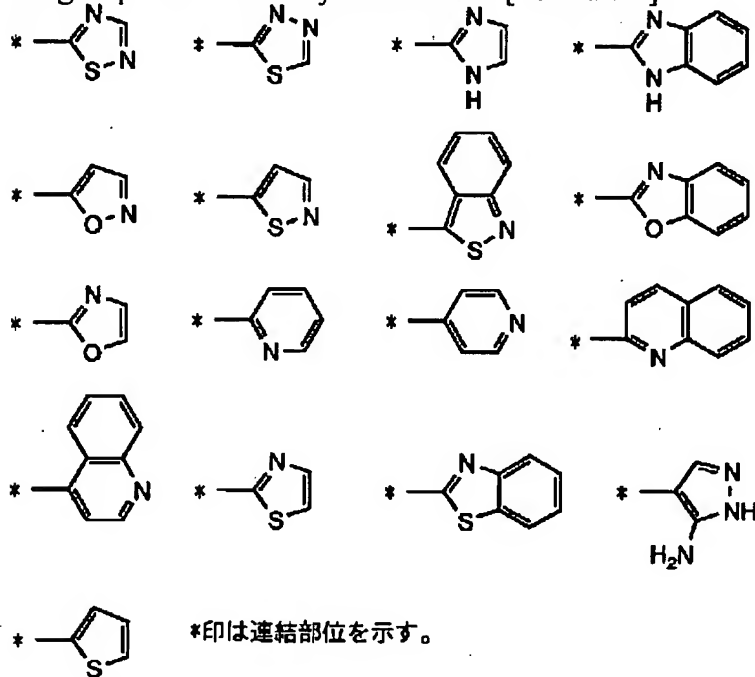
General formula (2)

[Formula 3]



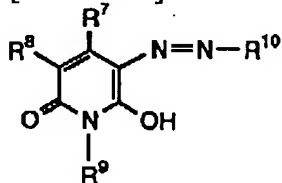
( $R^5$  expresses a hydrogen atom, a cyano group, an alkyl group, a cycloalkyl radical, an aralkyl radical, an aryl group, an alkylthio group, an arylthio radical, or an ionicity hydrophilic radical among a general formula (2).)  $Z_a$  expresses  $-N=$ ,  $-NH-$ , or  $-C(R^{11})=$ .  $Z_b$  and  $Z_c$  express  $-N=$  or  $-C(R^{11})=$  independently respectively. Here,  $R^{11}$  expresses a hydrogen atom or a nonmetal substituent.  $R^6$  expresses the heterocycle radical which is chosen from the group 2 of the following heterocycle radical and which may be permuted. However, the water soluble dye expressed with a general formula (1) has at least one ionicity hydrophilic radical in a molecule.

the group 2 of a heterocycle radical -- [Formula 4]



General formula (3)

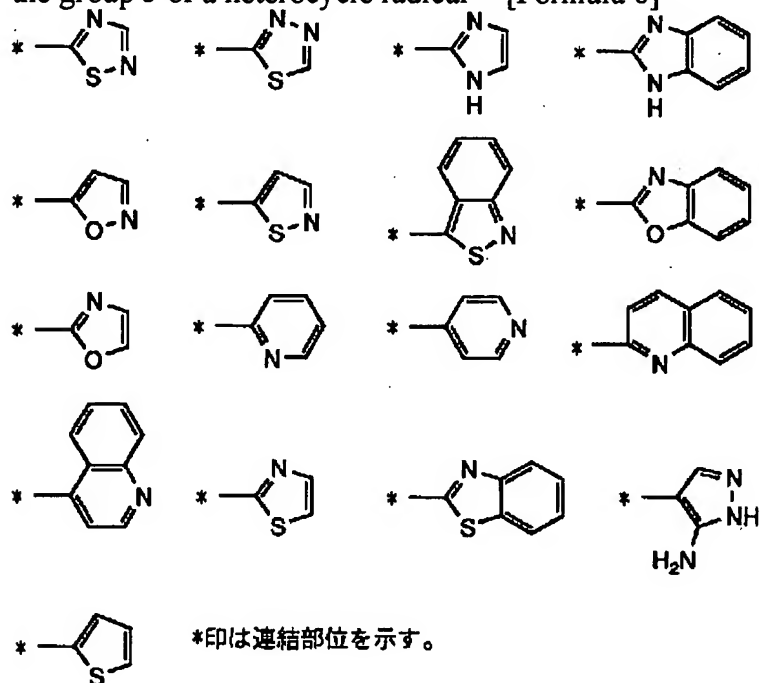
[Formula 5]



( $R^7$  and  $R^9$  express a hydrogen atom, a cyano group, an alkyl group, a cycloalkyl radical, an aralkyl radical, an aryl group, an alkylthio group, an arylthio radical, or an ionicity hydrophilic radical independently respectively among a general formula (3).)  $R^8$  expresses a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, an aryl group, an aryloxy group, a cyano group, the acylamino radical, a sulfonylamino radical, an alkoxy carbonylamino radical, an ureido radical, an alkylthio group, an arylthio radical, an alkoxy carbonyl group, a carbamoyl group, a sulfamoyl group, a sulfonyl group, an acyl group, an alkylamino radical, an arylamino radical, a hydroxy group, or an ionicity hydrophilic radical.  $R^{10}$  expresses the heterocycle radical which is chosen from the group 3 of the following heterocycle radical and which may be permuted. However, the water soluble dye expressed with a

general formula (3) has at least one ionicity hydrophilic radical in a molecule.

the group 3 of a heterocycle radical -- [Formula 6]



[Claim 2] The ink constituent according to claim 1 characterized by expressing a water-soluble organic solvent with the following general formula (I).

(General-formula I):  $R_7O(R_8O)_nH$  (among a formula (I), the alkyl group of carbon numbers 1-4 and  $R_8$  express the alkylene group of carbon numbers 2 or 3, and, as for  $n$ ,  $R_7$  expresses the integer of 2-5.)

[Claim 3] The ink constituent according to claim 1 or 2 with which the content of a water-soluble organic solvent is characterized by being one to 70 mass % to an ink constituent [claim 4] The ink constituent according to claim 1 to 3 characterized by furthermore containing a surfactant.

[Claim 5] The ink jet record approach characterized by using an ink constituent according to claim 1 to 4.

[Claim 6] The ink jet record approach which is the ink jet record approach which the television ingredient which has a television layer containing a white inorganic pigment particle is made to breathe out an ink droplet according to a record signal, and records an image on a television ingredient on a base material, and is characterized by an ink droplet consisting of an ink constituent according to claim 1 to 4.

[Translation done.]

**\* NOTICES \***

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**DETAILED DESCRIPTION**

---

**[Detailed Description of the Invention]****[0001]**

**[Field of the Invention]** The quality of this invention of a record image is high, and it excels in regurgitation stability, and is related with the ink constituent used for the ink jet record excellent in the shelf life of the image moreover obtained, and the ink jet record approach using this ink constituent.

**[0002]**

**[Description of the Prior Art]** In order that an ink jet printer may print on paper, a film, cloth, etc. with the spread of computers not only at office but at a home in recent years, it is used widely. There is a method which a pressure is applied [ method ] by the piezo-electric element and makes a drop breathe out, a method which generates air bubbles in ink with heat, and makes a drop breathe out, a method using a supersonic wave, or a method to which the attraction regurgitation of the drop is carried out according to electrostatic force in the ink jet record approach. As these ink for ink jet record, water color ink, oily ink, or solid-state (melting mold) ink is used. Points, such as manufacture, and handling nature, an odor, safety, to water color ink is in use among these ink.

**[0003]** As opposed to the coloring agent used for these ink for ink jet record A hue is [ that the solubility over a solvent is high, that high concentration record is possible, ] good, Excelling in the robustness over light, heat, air, water, or a chemical, that fixable cannot permeate easily well to a television ingredient, to excel in the shelf life as ink, that there is no toxicity, that purity is high, and to be able to obtain still more cheaply are demanded. However, it is very difficult to hunt for [ the coloring agent which fills these demands with high level ]. Especially, it has a good yellow hue and a coloring agent excellent in light fastness is desired strongly.

**[0004]** Although various colors and pigments as an object for ink jets are already proposed and it is used actually, the actual condition is that the coloring agent with which it is still satisfied of all demands is not discovered. It is difficult to reconcile the hue required of the ink for ink jet record, and robustness with the color well known from the former to which the Color Index (C. I.) number is given, or a pigment. The ink for ink jets aiming at coexistence of a hue and light fastness is indicated by JP,2-212566,A. However, the color used in this official report has an improvement of a hue and inadequate light fastness. There is a problem also in wet heat robustness at coloring matter given in this official report. moreover -- although thiadiazolyl-azo-pyrazole yellow coloring matter is shown in JP,4-22714,A as coloring matter for thermal ink transfer printing -- this coloring matter -- the solubility to a water solution -- inadequate -- an ink jet -- service water -- it cannot be used as solubility ink.

**[0005]** Moreover, there were many examples used as a color dissolution accelerator like JP,2-3837,B in on the other hand using glycol ether as a wetting agent like JP,2-2907,B in the conventional ink for ink jet record.

**[0006]** However, the Prior art of the permeability over the paper of ink was inadequate in many cases, and since desiccation of printing took time amount, when continuation printing was carried out, since the printed ink in the paper was not able to get dry easily, it had the fault that it could not pile up immediately.

[0007]

[Problem(s) to be Solved by the Invention] Regurgitation stability and intermittent regurgitation stability are high, a hue, weatherability, and image quality are improved, and the object of this invention is to offer the ink constituent for ink jet record with the quick ink rate of drying in the record paper. Other objects of this invention are the radicals of good regurgitation stability and intermittent regurgitation stability, and are to offer the ink jet record approach of giving the image of the outstanding hue, weatherability, and image quality.

[0008]

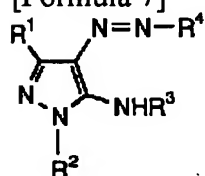
[Means for Solving the Problem] The object of this invention is attained by the ink constituent and the ink jet record approach of the following configuration. That is, this invention is a following ink constituent and the following ink jet record approach.

1. Ink constituent characterized by being ink constituent with which color is dissolving or distributing in aqueous medium, and contains at least one sort of water-soluble organic solvents, and being at least one sort as which this color is chosen from water soluble dye expressed with following general formula (1) - (3).

General formula (1)

[0009]

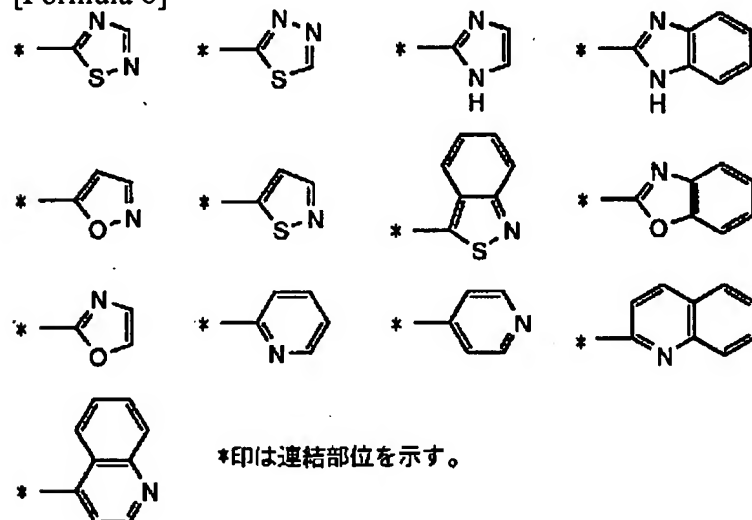
[Formula 7]



[0010] (R1, R2, and R3 express a hydrogen atom, a halogen atom, a cyano group, an alkyl group, a cycloalkyl radical, an aralkyl radical, an aryl group, an alkylthio group, an arylthio radical, or an ionicity hydrophilic radical independently respectively among a general formula (1).) R4 expresses the heterocycle radical which is chosen from the group 1 of the following heterocycle radical and which may be permuted. However, the water soluble dye expressed with a general formula (1) has at least one ionicity hydrophilic radical in a molecule.

The group 1 of a heterocycle radical [0011]

[Formula 8]



[0012] General formula (2)

[0013]

[Formula 9]

N0000=15&N0001=web133&N0002=007&N0003=JPA415041162\_000010.gif&N0004=200710130243:  
WIDTH="104" HEIGHT="85" ALT="ID=000010">

The group 2 of a heterocycle radical [0015]

\*印は連結部位を示す。

[0017]

O=C1C(=C(R7)N=N(R10))C(O)=C(R8)N1R9

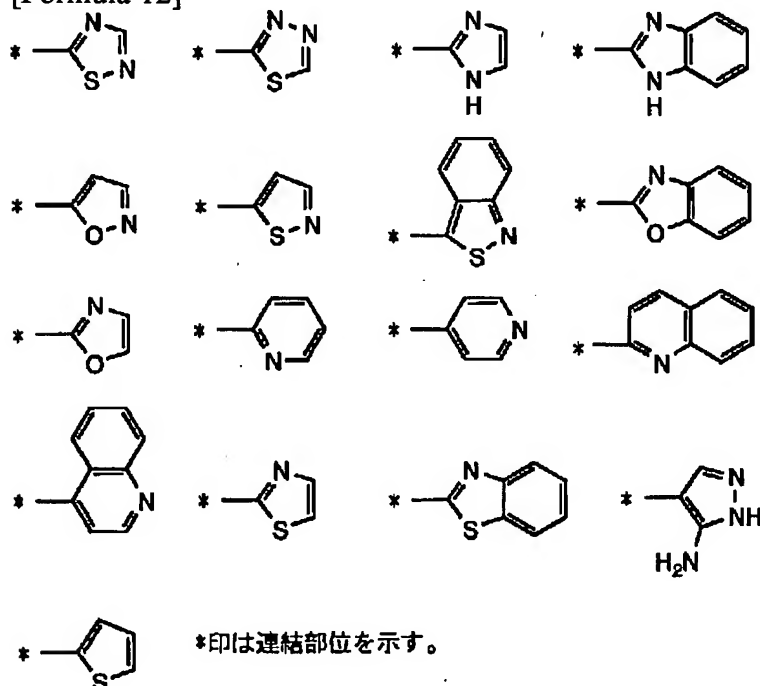
[0018] (R7 and R9 express a hydrogen atom, a cyano group, an alkyl group, a cycloalkyl radical, an aralkyl radical, an aryl group, an alkylthio group, an arylthio radical, or an ionicity hydrophilic radical independently respectively among a general formula (3).) R8 expresses a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, an aryl group, an aryloxy group, a cyano group, the acylamino radical, a sulfonylamino radical, an alkoxycarbonylamino radical, an ureido radical, an alkylthio group, an arylthio radical, an alkoxy carbonyl group, a carbamoyl group, a sulfamoyl group, a sulfonyl group, an acyl group, an alkylamino radical, an arylamino radical, a hydroxy group, or an ionicity hydrophilic radical. R10 expresses the heterocycle radical which is chosen from the group 3 of the following heterocycle radical and which may be permuted. However, the water soluble dye expressed with a



general formula (3) has at least one ionicity hydrophilic radical in a molecule.

The group 3 of a heterocycle radical [0019]

[Formula 12]



[0020] 2. Ink constituent given in the above 1 characterized by expressing water-soluble organic solvent with following general formula (I).

(General-formula I):  $R_7O(R_8O)nH$  (among a formula (I), the alkyl group of carbon numbers 1-4 and R8 express the alkylene group of carbon numbers 2 or 3, and, as for n, R7 expresses the integer of 2-5.)

3. Ink constituent given in either of the above 1-3 to which content of water-soluble organic solvent is characterized by containing ink constituent 4. surfactant of publication in the above 1 or 2 to which it is characterized by being one to 70 mass % to ink constituent.

5. Ink jet record approach characterized by using ink constituent of publication for either of the above 1-4.

6. Ink jet record approach which is ink jet record approach which television ingredient which has television layer containing white inorganic pigment particle is made to breathe out ink droplet according to record signal, and records image on television ingredient on base material, and is characterized by ink droplet becoming either of the above 1-4 from ink constituent of publication.

[0021]

[Embodiment of the Invention] Hereafter, this invention is further explained to a detail. The ink constituent of this invention contains at least one sort chosen from the water soluble dye expressed with above-mentioned general formula (1) - (3). The above-mentioned general formula (1) It has the features that a hue is good while the water soluble dye expressed with - (3) has good light fastness. Said general formula (1) Also in the color expressed with - (3), the peak of an absorption spectrum shows a sharp configuration and especially a yellow color has it. [ desirable ] Furthermore, the yellow color whose ratio  $(I_{\lambda_{\text{damax}}+70}/I_{\lambda_{\text{damax}}})$  of absorbance  $I_{\lambda_{\text{damax}}+70}$  of  $I_{\lambda_{\text{damax}}}$  (the absorbance  $I_{\lambda_{\text{damax}}}$  of nm) and  $\lambda_{\text{damax}}+70(\text{nm})$  of the absorption spectrum of the water solution of a color is 0.2 or less is desirable.

[0022] R1, R2, R3, R5, R7, and R9 express a hydrogen atom, a halogen atom, a cyano group, an alkyl group, a cycloalkyl radical, an aralkyl radical, an aryl group, an alkylthio group, an arylthio radical, or an ionicity hydrophilic radical independently respectively among general formula (1) - (3). The alkyl group which has a substituent, and a non-permuted alkyl group are contained in the alkyl group which R1, R2, R3, R5, R7, and R9 express. As this alkyl group, the alkyl group of 1-12 has a desirable carbon

atomic number. Hydroxyl, an alkoxy group, a cyano group, a halogen atom, and an ionicity hydrophilic radical are contained in the example of a substituent. Methyl, ethyl, butyl, isopropyl, t-butyl, hydroxyethyl, methoxy ethyl, cyano ethyl, trifluoromethyl, 3-sulfopropyl, and 4-sulfo butyl are contained in the example of an alkyl group.

[0023] The cycloalkyl radical which has a substituent, and a non-permuted cycloalkyl radical are contained in the cycloalkyl radical which R1, R2, R3, R5, R7, and R9 express. As a cycloalkyl radical, the cycloalkyl radical of 5-12 has a desirable carbon atomic number. An ionicity hydrophilic radical is contained in the example of a substituent. Cyclohexyl is contained in the example of a cycloalkyl radical. The aralkyl radical which has a substituent, and a non-permuted aralkyl radical are contained in the aralkyl radical which R1, R2, R3, R5, R7, and R9 express. As an aralkyl radical, the aralkyl radical of 7-12 has a desirable carbon atomic number. An ionicity hydrophilic radical is contained in the example of a substituent. Benzyl and 2-phenethyl are contained in the example of an aralkyl radical.

[0024] The aryl group which has a substituent, and a non-permuted aryl group are contained in the aryl group which R1, R2, R3, R5, R7, and R9 express. As an aryl group, the aryl group of 7-12 has a desirable carbon atomic number. An alkyl group, an alkoxy group, a halogen atom, an alkylamino radical, and an ionicity hydrophilic radical are contained in the example of a substituent. Phenyl, p-tolyl, p-methoxyphenyl, o-chlorophenyl, and m-(3-sulfopropyl amino) phenyl are contained in the example of an aryl group.

[0025] The alkylthio group which has a substituent, and a non-permuted alkylthio group are contained in the alkylthio group which R1, R2, R3, R5, R7, and R9 express. As an alkylthio group, the alkylthio group of 1-12 has a desirable carbon atomic number. An ionicity hydrophilic radical is contained in the example of a substituent. A methylthio and ethyl thio are contained in the example of an alkylthio group. The arylthio radical which has a substituent, and a non-permuted arylthio radical are contained in the arylthio radical which R1, R2, R3, R5, R7, and R9 express. As an arylthio radical, the arylthio radical of 6-12 has a desirable carbon atomic number. An alkyl group and an ionicity hydrophilic radical are contained in the example of a substituent. A phenylthio radical and p-tolyl thio are contained in the example of an arylthio radical.

[0026] A sulfonic group, a phosphono radical, a carboxyl group, and the 4th class ammonium are contained in the ionicity hydrophilic radical which R1, R2, R3, R5, R7, and R9 express. Especially, a sulfonic group and a carboxyl group are desirable, and especially a sulfonic group is desirable. A carboxyl group and a sulfonic group may be in the condition of a salt, and alkali-metal ion (an example, sodium ion, potassium ion), ammonium ion, and an organic cation (an example, tetramethyl GUANILUMU ion) are contained in the example of the counter ion which forms a salt.

[0027] R8 expresses a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, an aryl group, an aryloxy group, a cyano group, the acylamino radical, a sulfonylamino radical, an alkoxycarbonylamino radical, an ureido radical, an alkylthio group, an arylthio radical, an alkoxy carbonyl group, a carbamoyl group, a sulfamoyl group, a sulfonyl group, an acyl group, an alkylamino radical, an arylamino radical, a hydroxy group, or an ionicity hydrophilic radical among a general formula (3).

[0028] As a halogen atom which R8 expresses, a fluorine atom, a chlorine atom, and a bromine atom are mentioned. The alkyl group which has a substituent, and a non-permuted alkyl group are contained in the alkyl group which R8 expresses. The carbon atomic number of an alkyl group is [ the alkyl group of 1-12 ] desirable. Hydroxyl, an alkoxy group, a cyano group, a halogen atom, and an ionicity hydrophilic radical are contained in the example of a substituent. Methyl, ethyl, butyl, isopropyl, t-butyl, hydroxyethyl, methoxy ethyl, cyano ethyl, trifluoromethyl, 3-sulfopropyl, and 4-sulfo butyl are contained in the example of an alkyl group.

[0029] The alkoxy group which has a substituent, and a non-permuted alkoxy group are contained in the alkoxy group which R8 expresses. As an alkoxy group, the alkoxy group of 1-12 has a desirable carbon atomic number. Hydroxyl and an ionicity hydrophilic radical are contained in the example of a substituent. Methoxy and ethoxy \*\* isopropoxy, methoxyethoxy one, and hydroxy ethoxy \*\*\*\*\* 3-carboxy propoxy are contained in the example of an alkoxy group. The aryl group which has a

substituent, and a non-permuted aryl group are contained in the aryl group which R8 expresses. As an aryl group, the aryl group of 7-12 has a desirable carbon atomic number. An alkyl group, an alkoxy group, a halogen atom, an alkylamino radical, and an ionicity hydrophilic radical are contained in the example of a substituent. Phenyl, p-tolyl, p-methoxyphenyl, o-chlorophenyl, and m-(3-sulfopropyl amino) phenyl are contained in the example of an aryl group.

[0030] The aryloxy group which has a substituent, and a non-permuted aryloxy group are contained in the aryloxy group which R8 expresses. As an aryloxy group, the aryloxy group of 6-12 has a desirable carbon atomic number. An alkoxy group and an ionicity hydrophilic radical are contained in the example of a substituent. Phenoxy, p-methoxy phenoxy, and o-methoxy phenoxy are contained in the example of an aryloxy group. The acylamino radical which has a substituent, and the non-permuted acylamino radical are contained in the acylamino radical which R8 expresses. As an acylamino radical, the acylamino radical of 2-12 has a desirable carbon atomic number. An ionicity hydrophilic radical is contained in the example of a substituent. An acetamide, propione amide, benzamide and 3, and 5-disulfo benzamide is contained in the example of the acylamino radical.

[0031] The sulfonylamino radical which has a substituent, and a non-permuted sulfonylamino radical are contained in the sulfonylamino radical which R8 expresses. As a sulfonylamino radical, the sulfonylamino radical of 2-12 has a desirable carbon atomic number. Methylsulfonylamino and ethyl sulfonylamino are contained in the example of a sulfonylamino radical. The alkoxycarbonylamino radical which has a substituent, and a non-permuted alkoxycarbonylamino radical are contained in the alkoxycarbonylamino radical which R8 expresses. As an alkoxycarbonylamino radical, the alkoxycarbonylamino radical of 2-12 has a desirable carbon atomic number. An ionicity hydrophilic radical is contained in the example of a substituent. Ethoxycarbonylamino is contained in the example of an alkoxycarbonylamino radical.

[0032] The ureido radical which has a substituent, and a non-permuted ureido radical are contained in the ureido radical which R8 expresses. As an ureido radical, the ureido radical of 1-12 has a desirable carbon atomic number. An alkyl group and an aryl group are contained in the example of a substituent. 3-methyl ureido, 3, and 3-dimethyl ureido and 3-phenyl ureido are contained in the example of an ureido radical. The alkylthio group which has a substituent, and a non-permuted alkylthio group are contained in the alkylthio group which R8 expresses. As an alkylthio group, the alkylthio group of 1-12 has a desirable carbon atomic number. An ionicity hydrophilic radical is contained in the example of a substituent. A methylthio and ethyl thio are contained in the example of an alkylthio group.

[0033] The arylthio radical which has a substituent, and a non-permuted arylthio radical are contained in the arylthio radical which R8 expresses. As an arylthio radical, the arylthio radical of 6-12 has a desirable carbon atomic number. An alkyl group and an ionicity hydrophilic radical are contained in the example of a substituent. Phenylthio and p-tolyl thio radical are contained in the example of an arylthio radical. The alkoxy carbonyl group which has a substituent, and a non-permuted alkoxy carbonyl group are contained in the alkoxy carbonyl group which R8 expresses. As an alkoxy carbonyl group, the alkoxy carbonyl group of 2-12 has a desirable carbon atomic number. An ionicity hydrophilic radical is contained in the example of a substituent. Methoxycarbonyl and ethoxycarbonyl are contained in the example of an alkoxy carbonyl group.

[0034] The carbamoyl group which has a substituent, and a non-permuted carbamoyl group are contained in the carbamoyl group which R8 expresses. An alkyl group is contained in the example of a substituent. A methylcarbamoyl radical and a dimethyl carbamoyl group are contained in the example of a carbamoyl group. The sulfamoyl group which has the substituent which R8 expresses, and a non-permuted sulfamoyl group are contained. An alkyl group is contained in the example of a substituent. A dimethyl sulfamoyl group and a G (2-hydroxyethyl) sulfamoyl group are contained in the example of a sulfamoyl group.

[0035] A methane sulfonyl and a phenyl sulfonyl are contained in the example of a sulfonyl group which R8 expresses. The acyl group which has a substituent, and a non-permuted acyl group are contained in the acyl group which R8 expresses. As an acyl group, the acyl group of 1-12 has a desirable carbon atomic number. An ionicity hydrophilic radical is contained in the example of a substituent.

Acetyl and benzoyl are contained in the example of an acyl group.

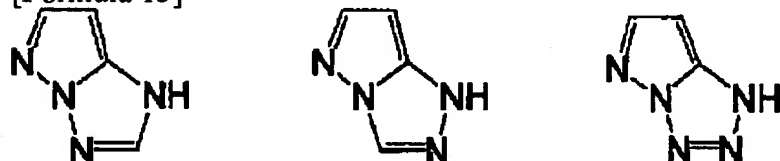
[0036] The alkylamino radical which has a substituent, and a non-permuted alkylamino radical are contained in the alkylamino radical which R8 expresses. As an alkylamino radical, the alkylamino radical of the carbon atomic numbers 1-6 is desirable. An ionicity hydrophilic radical is contained in the example of a substituent. Methylamino and diethylamino are contained in the example of an alkylamino radical. The arylamino radical which has a substituent, and a non-permuted arylamino radical are contained in the arylamino radical which R8 expresses. As an arylamino radical, the arylamino radical of 6-12 has a desirable carbon atomic number. As an example of a substituent, a halogen atom and an ionicity hydrophilic radical are contained. ANIRINO and 2-chloroanilino are contained as an example of an arylamino radical.

[0037] A sulfonic group, a carboxyl group, a phosphono radical, and the 4th class ammonium are contained in the ionicity hydrophilic radical which R8 expresses. Especially, a sulfonic group and a carboxyl group are desirable, and especially a sulfonic group is desirable. A carboxyl group and a sulfonic group may be in the condition of a salt, and alkali-metal ion (an example, sodium ion, potassium ion) and an organic cation (an example, tetramethyl GUANIJUMU ion) are contained in the example of the counter ion which forms a salt.

[0038] Za expresses  $-N=$ ,  $-NH-$ , or  $-C(R11)=$  among a general formula (2), Zb and Zc express  $-N=$  or  $-C(R11)=$  independently respectively, and R11 expresses a hydrogen atom or a nonmetal substituent. As a nonmetal substituent which R11 expresses, a cyano group, a cycloalkyl radical, an aralkyl radical, an aryl group, an alkylthio group, an arylthio radical, or an ionicity hydrophilic radical is desirable. Each of a substituent is synonymous with each substituent which said R1 expresses, and its same is said of a desirable example. The example of a frame of the heterocycle which consists of two five-membered rings contained in a general formula (2) is shown below.

[0039]

[Formula 13]



[0040] R4 expresses the heterocycle radical which is chosen from the group 1 of a heterocycle radical and which may be permuted among a general formula (1). As a substituent, the alkyl group, the aryl group, the alkyl or the arylthio radical, the halogen atom, a cyano group, a sulfamoyl group, a sulfone amino group, a carbamoyl group, the acylamino radical, etc. of 1-12 are contained, and, as for the alkyl group, the aryl group, etc., the ionicity hydrophilic radical and the carbon atomic number may have the substituent further. Also in the heterocycle radical shown in a group 1, 1, 2, 4-thiadiazole, 1 and 3, 4-thiadiazole, and an imidazole are desirable.

[0041] R6 expresses the heterocycle radical which is chosen from the group 2 of a heterocycle radical and which may be permuted among a general formula (2). As a substituent, the alkyl group, the aryl group, the alkyl or the arylthio radical, the halogen atom, a cyano group, a sulfamoyl group, a sulfone amino group, a carbamoyl group, the acylamino radical, etc. of 1-12 are contained, and, as for the alkyl group and the aryl group, the ionicity hydrophilic radical and the carbon atomic number may have the substituent further. Also in the heterocycle radical shown in a group 2, 1, 2, 4-thiadiazole, 1 and 3, 4-thiadiazole, an imidazole, benzothiazole, and benzooxazole are desirable.

[0042] R10 expresses the heterocycle radical by which either which is chosen from the group 3 of a heterocycle radical may be permuted among a general formula (3). As a substituent, the alkyl group, the aryl group, the alkyl or the arylthio radical, the halogen atom, a cyano group, a sulfamoyl group, a sulfone amino group, a carbamoyl group, the acylamino radical, etc. of 1-12 are contained, and, as for the alkyl group, the aryl group, etc., the ionicity hydrophilic radical and the carbon atomic number may have the substituent further. Also in the heterocycle radical shown in a group 3, 1, 2, 4-thiadiazole, 1 and

3, 4-thiadiazole, an imidazole, benzothiazole, and benzooxazole are desirable.

[0043] General formula (1) The water soluble dye expressed with - (3) contains at least one ionicity hydrophilic radical in a molecule. The water soluble dye in which R1-R11 in general formula (1) - (3) besides the water soluble dye whose R1, R2, R3, R5, R7, R8, and R9 in general formula (1) - (3) are an ionicity hydrophilic radical have an ionicity hydrophilic radical as a substituent further is contained.

Thus, since water soluble dye has an ionicity hydrophilic radical in a molecule, its solubility or dispersibility over an aqueous medium is good. A sulfonic group, a carboxyl group, a phosphono radical, and the 4th class ammonium are contained in an ionicity hydrophilic radical. Especially, a sulfonic group and a carboxyl group are desirable, and especially a sulfonic group is desirable.

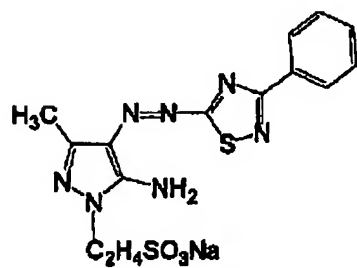
Moreover, when two or more sorts of ionicity hydrophilic radicals may be included in the molecule and two or more sorts of ionicity hydrophilic radicals are included, the combination of water soluble dye of a carboxyl group and a sulfonic group is desirable. A carboxyl group and a sulfonic group may be in the condition of a salt, and alkali-metal ion (example, sodium ion, potassium ion) ammonium ion and an organic cation (an example, tetramethyl GUANIJUMU ion) are contained in the example of the counter ion which forms a salt.

[0044] Although the example (1-1 to 1-16) of water soluble dye expressed with a general formula (1) below, the example (2-1 to 2-20) of water soluble dye expressed with a general formula (2), and the example (3-1 to 3-12) of water soluble dye expressed with a general formula (3) are shown, the color used for this invention is not limited to the following example.

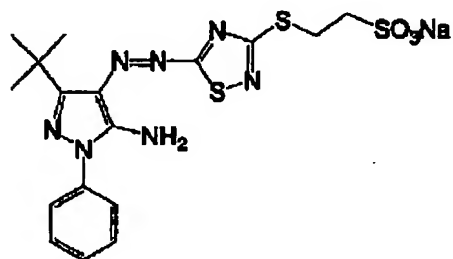
[0045]

[Formula 14]

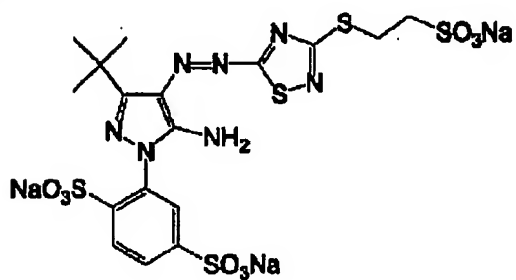
1-1



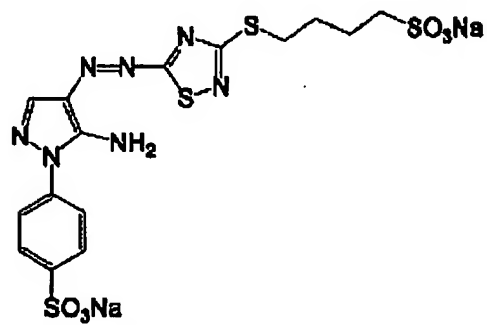
1-2



1-3



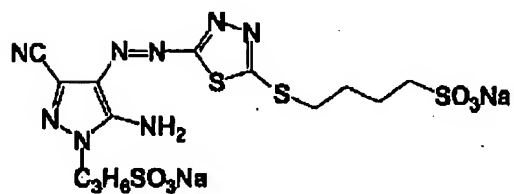
1-4



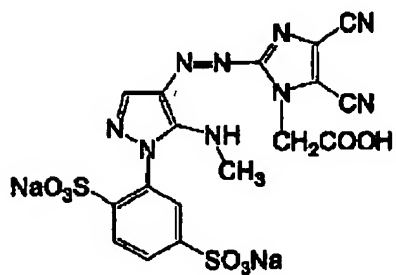
[0046]

[Formula 15]

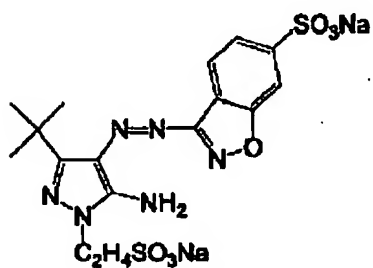
1-5



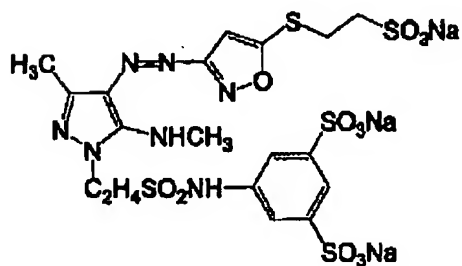
1-6



1-7



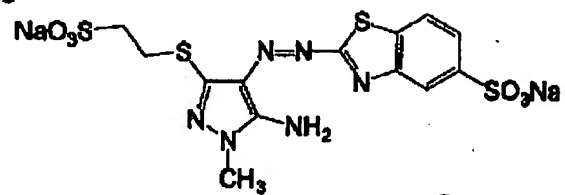
1-8



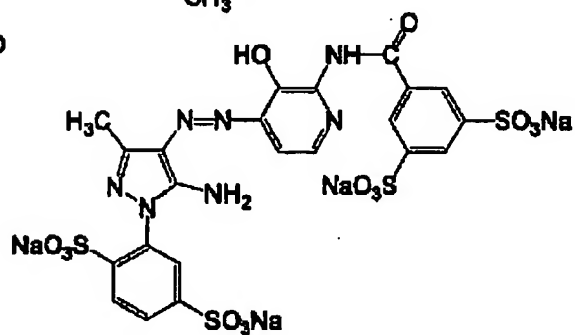
[0047]

[Formula 16]

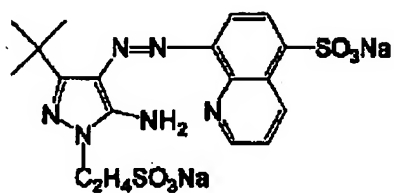
1-9



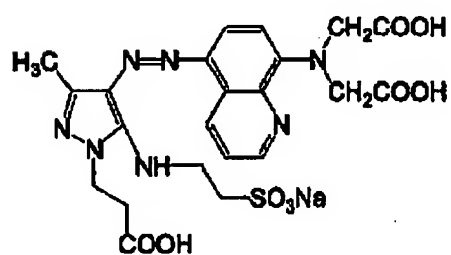
1-10



1-11



1-12

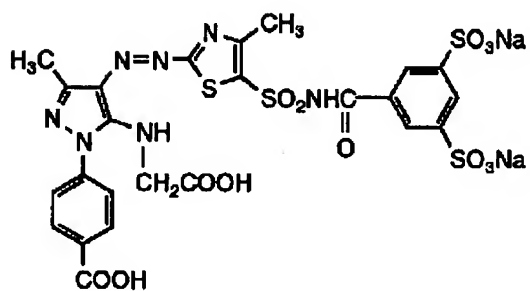


[0048]

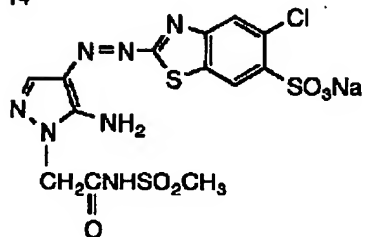
[Formula 17]



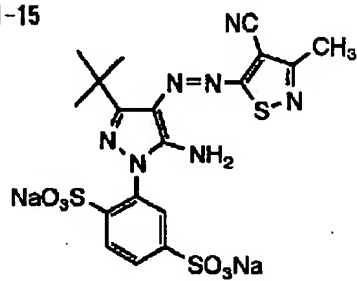
1-13



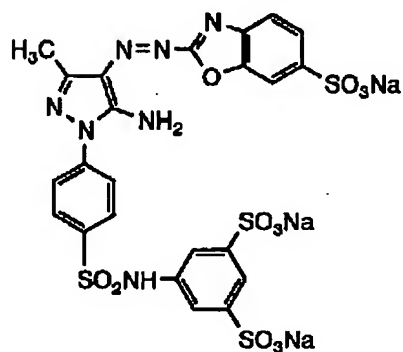
1-14



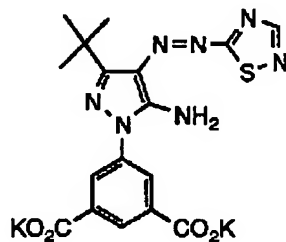
1-15



1-16



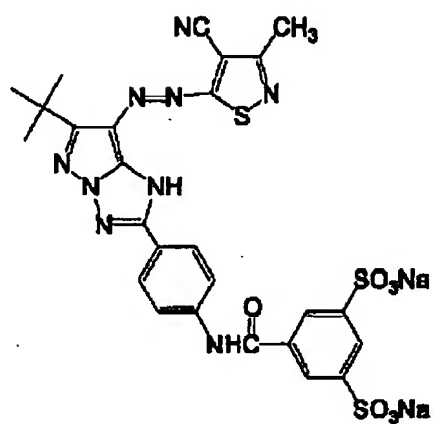
1-17



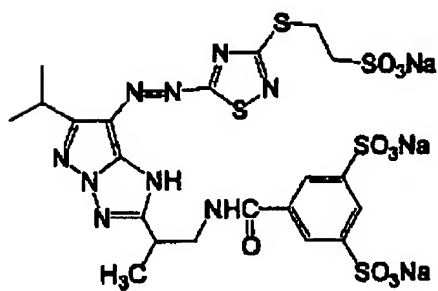
[0049]

[Formula 18]

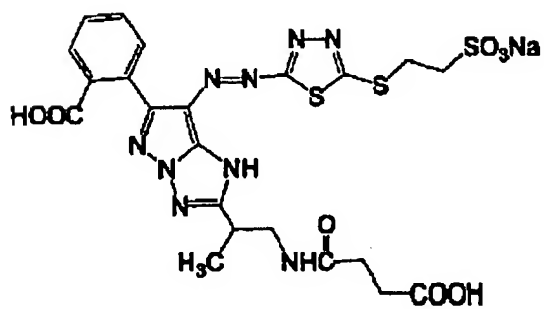
2-1



2-2



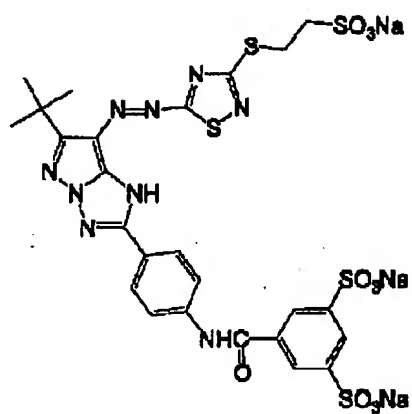
2-3



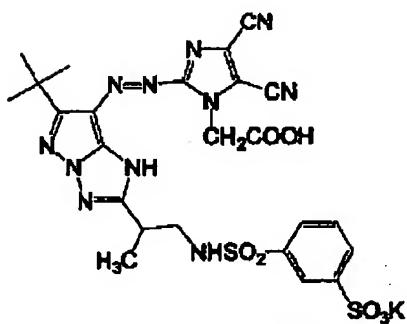
[0050]

[Formula 19]

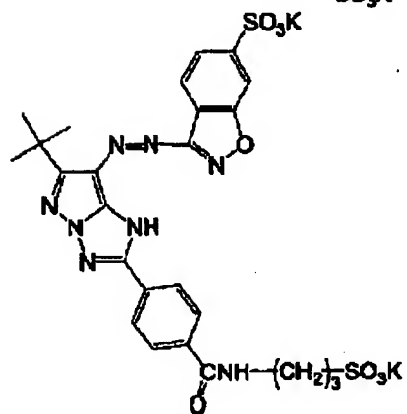
2-4



2-5



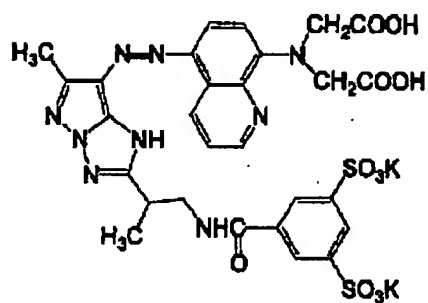
2-6



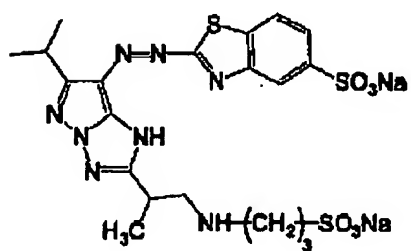
[0051]

[Formula 20]

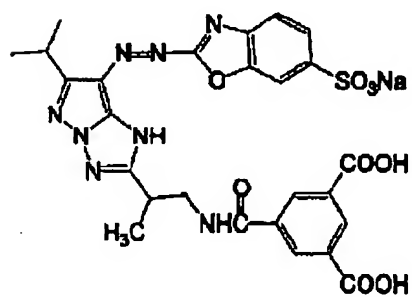
2-7



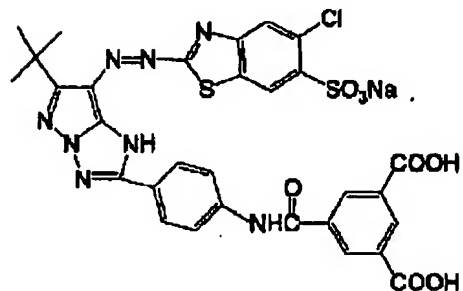
2-8



2-9

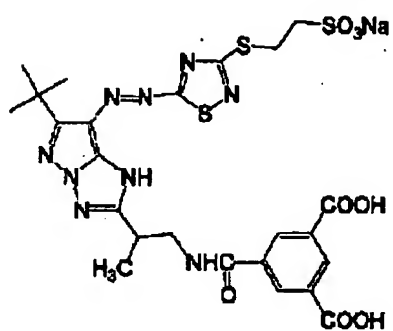


2-10

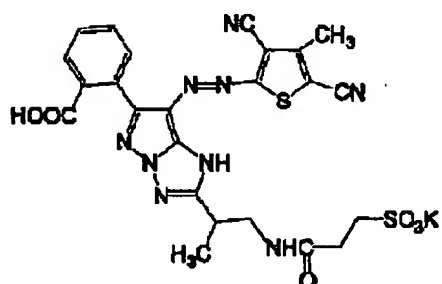


[0052]  
[Formula 21]

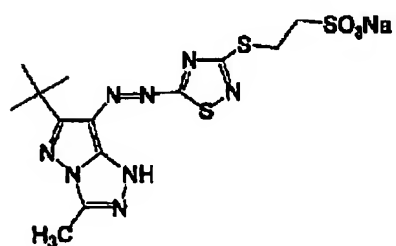
2-11



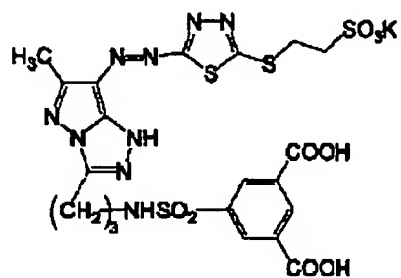
2-12



2-13



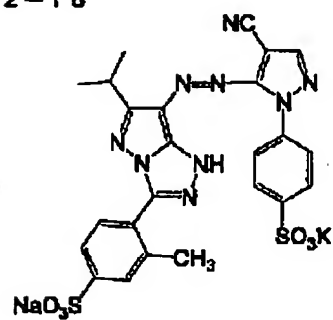
2-14



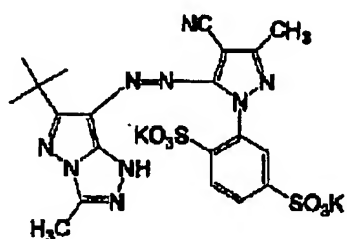
[0053]

[Formula 22]

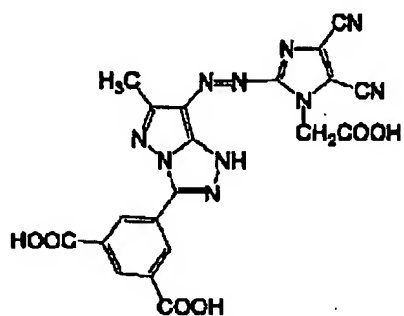
2-16



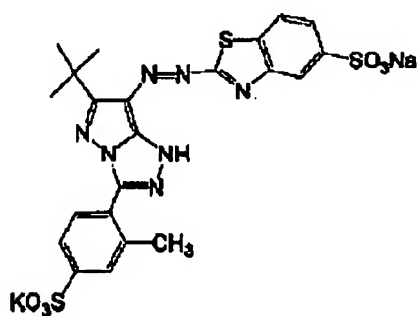
2-16



2-17



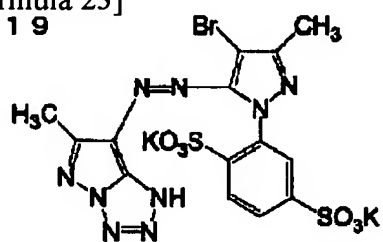
2-18



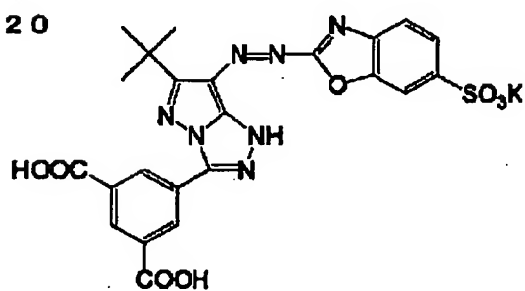
[0054]

[Formula 23]

2-19



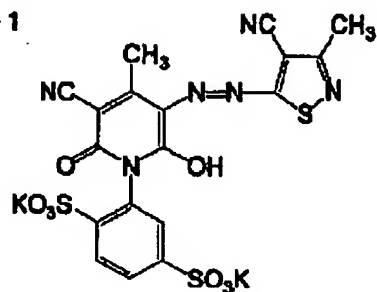
2-20



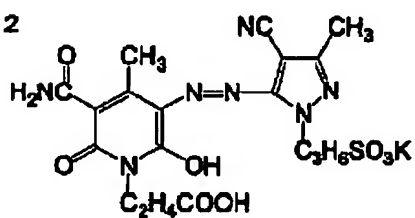
[0055]

[Formula 24]

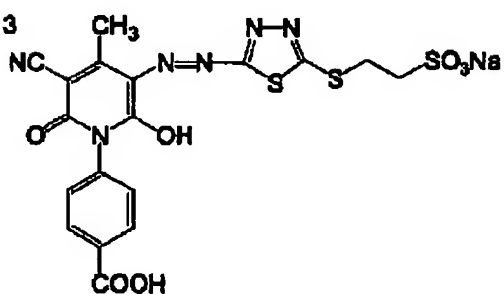
3-1



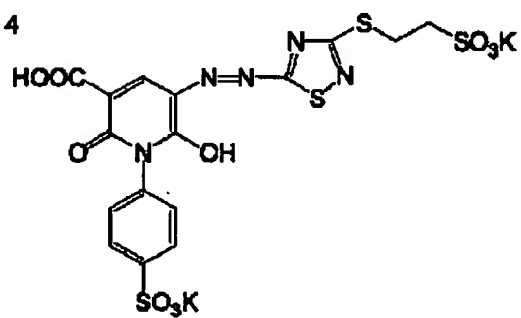
3-2



3-3



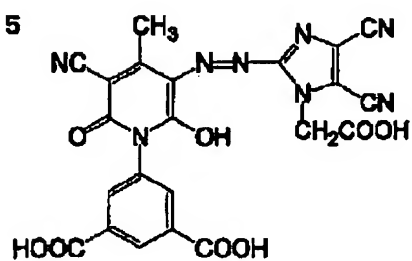
3-4



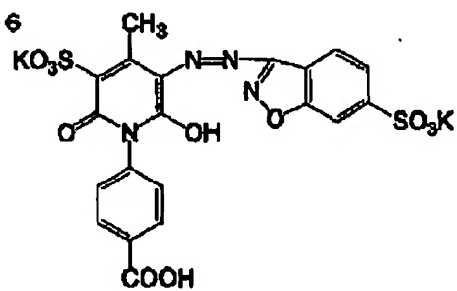
[0056]

[Formula 25]

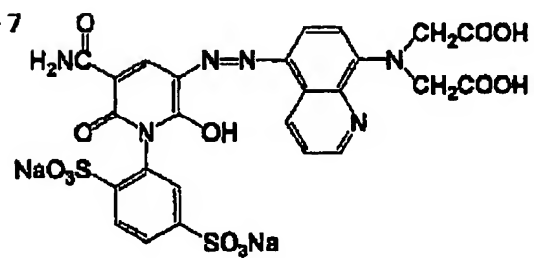
3-5



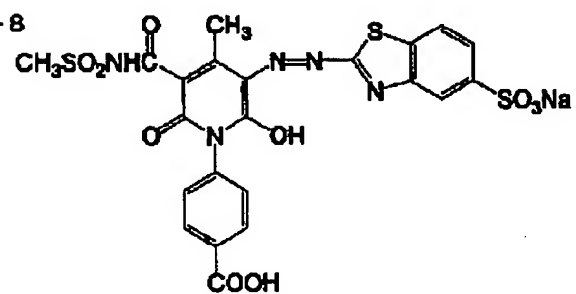
3-6



3-7



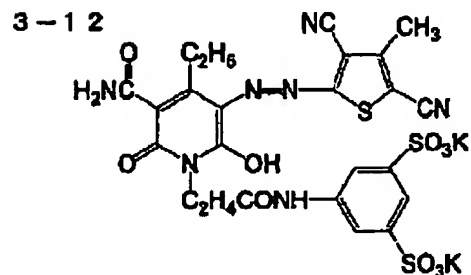
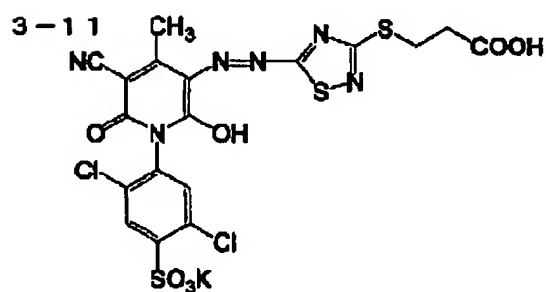
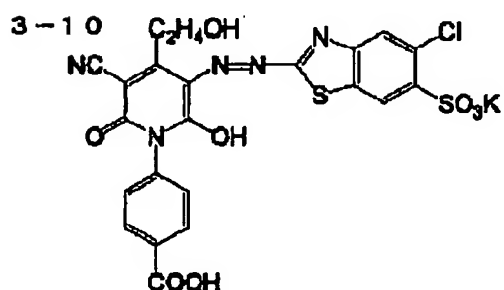
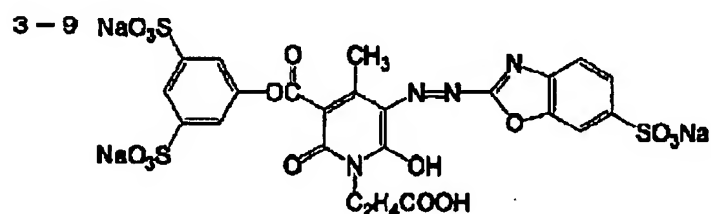
3-8



[0057]

[Formula 26]





[0058] General formula (1) The water soluble dye expressed with - (3) is compoundable with the coupling reaction of a diazo component and a coupler component. This water soluble dye is compoundable using the approach indicated by the application-for-patent No. 15614 [ 2001 to ] description.

[0059] The inside of the ink constituent 100 mass section of this invention, it is desirable to contain the water soluble dye (only henceforth a "color") expressed with general formula (1) - (3) below 20 mass sections more than the 0.2 mass section. Moreover, in the ink for ink jets of this invention, in order to obtain a full color image with a color and to prepare a color tone, other colors may be used together. The following can be mentioned as an example of the color which can be used together.

[0060] As a yellow color, for example as a coupling component, phenols, Naphthols, aniline, pyrazolones, and pyridone Methine dye [ , such as azomethine color; for example, a benzylidene color, which has opening-and-closing mold activity methylene compounds as aryl or HETERIRUAZO color;, for example, a coupling component, which has opening-and-closing mold activity methylene compounds, and a mono-methine oxo-Norian color ];, for example, a naphthoquinone color, There are quinone system colors, such as anthraquinone dye, etc. and a kino FUTARON color, nitroglycerine nitroso dye, acridine dye, an AKURIJINON color, etc. can be mentioned as color kinds other than this.

These colors may present yellow only after some KUROMO forehands may dissociate them, and the counter cations in that case may be alkali metal and an inorganic cation like ammonium, may be organic cations like pyridinium and quaternary ammonium salt, and may be polymer cations which have them in a substructure further.

[0061] As a Magenta color, for example as a coupling component, phenols, As aryl or HETERIRUAZO color, for example, a coupling component, which has naphthols and aniline, pyrazolones Azomethine color, for example, an ARIRIDEN color, which has pyrazolo triazoles Methine dye like a styryl color, a merocyanine color, and an oxo-Norian color; Diphenylmethane dye, Condensed multi-ring system colors, such as quinone system colors, for example, a dioxazine color etc., such as triphenylmethane dye and a carbonium color like xanthene dye, for example, a naphthoquinone, anthraquinone, and anthra pyridone, etc. can be mentioned. These colors may present a Magenta only after some KUROMO forehands may dissociate them, and the counter cations in that case may be alkali metal and an inorganic cation like ammonium, may be organic cations like pyridinium and quaternary ammonium salt, and may be polymer cations which have them in a substructure further.

[0062] As a cyanogen color, the aryl which has phenols, naphthols, and aniline, for example as carbonium color; phthalocyanine dye; anthraquinone dye; like Pori methine dye; diphenylmethane dye like India aniline dye, azomethine color; cyanine dye like indophenol dye, an oxo-Norian color, and a merocyanine color, triphenylmethane dye, and xanthene dye, for example, a coupling component, or a HETERIRUAZO color, and an indigo thioindigo color can be mentioned. These colors may present cyanogen only after some KUROMO forehands may dissociate them, and the counter cations in that case may be alkali metal and an inorganic cation like ammonium, may be organic cations like pyridinium and quaternary ammonium salt, and may be polymer cations which have them in a substructure further. Moreover, BURRAKU colors, such as a polyazo color, can also be used.

[0063] Next, the compound expressed with the general formula (I) which works as a desiccation inhibitor or an osmosis accelerator in the ink constituent of this invention is explained.

(General-formula I):  $R_7O(R_8O)_nH$  (among a formula (I), the alkyl group of carbon numbers 1-4 and R8 express the alkylene group of carbon numbers 2-3, and, as for n, R7 expresses the integer of 2-5.)

[0064] The compound expressed with a general formula (I) is a water-soluble organic solvent, and, specifically, the diethylene-glycol monomethyl ether, diethylene glycol monoethyl ether, the diethylene-glycol monobutyl ether, the triethylene glycol monomethyl ether, the triethylene glycol monobutyl ether, dipropylene glycol monomethyl ether, the dipropylene glycol monoethyl ether, and tripropylene glycol monomethyl ether are mentioned. Especially, the triethylene glycol monobutyl ether and the diethylene-glycol monobutyl ether are desirable, and especially the triethylene glycol monobutyl ether is desirable.

[0065] As for the water-soluble organic solvent expressed with a general formula (I), it is desirable to do 1-70 mass % content of into an ink constituent, and it is more desirable to do 10-60 mass % content of.

[0066] the compound by which the ink constituent of this invention is expressed with said general formula (I) the aforementioned coloring agent and if needed in an aqueous medium -- the dissolution -- and -- or it is producible by making it distribute. The "aqueous medium" in this invention means what added additives, such as a wetting agent, a stabilizer, and antiseptics, into the mixture of water or water, and a little water miscibility organic solvent if needed.

[0067] For the example of the water miscibility organic solvent which can be used in this invention in addition to the water-soluble organic solvent expressed with a general formula (I) alcohol (for example, a methanol, ethanol, propanol, and isopropanol --) A butanol, isobutanol, a sec-butanol, t-butanol, A pentanol, a hexanol, a cyclohexanol, benzyl alcohol, polyhydric alcohol (for example, ethylene glycol and a diethylene glycol --) Triethylene glycol, a polyethylene glycol, propylene glycol, Dipropylene glycol, a polypropylene glycol, a butylene glycol, Hexandiol, pentanediol, a glycerol, hexane triol, thiodiglycol and an amine (for example, ethanolamine and diethanolamine --) Triethanolamine, N-methyldiethanolamine, N-ethyl diethanolamine, A morpholine, N-ethyl morpholine, ethylene DIAMINE, diethylenetriamine, Triethylenetetramine, polyethyleneimine, tetramethyl propylenediamine, and other polar solvents for example, a formamide, N,N-dimethylformamide, and N,N-dimethylacetamide -- Dimethyl sulfoxide, a sulfolane, 2-pyrrolidone, a N-methyl-2-pyrrolidone, an N-vinyl-2-pyrrolidone, 2-

oxazolidone, 1,3-dimethyl-2-imidazolidinone, an acetonitrile, and an acetone are mentioned. In addition, these water miscibility organic solvent may use two or more kinds together.

[0068] The above-mentioned water miscibility organic solvent is more preferably used in the range below 50 mass % more than 1 mass % below 50 mass % more than 0.1 mass % to an ink constituent.

[0069] When using the ink constituent of this invention as ink for ink jet record, additives, such as the osmosis accelerator for making the desiccation inhibitor for preventing the blinding by \*\*\*\* in the injection tip of ink and ink permeate well in paper, an ultraviolet ray absorbent, an antioxidant, a viscosity controlling agent, a surface tension regulator, a dispersant, a distributed stabilizer, an antifungal agent, a rust-proofer, pH regulator, a defoaming agent, and a chelating agent, can be chosen suitably, and an optimum dose activity can be carried out.

[0070] As a desiccation inhibitor used for this invention, a water-soluble organic solvent with vapor pressure lower than water is desirable. As a concrete example, ethylene glycol, propylene glycol, a diethylene glycol, A polyethylene glycol, thiodiglycol, dithio diethylene glycol, 2-methyl-1,3-propanediol, 1 and 2, 6-hexane triol, The polyhydric alcohol represented by an acetylene glycol derivative, a glycerol, trimethylol propane, etc. The ethylene glycol monomethyl (or ethyl) ether, the diethylene-glycol monomethyl (or ethyl) ether, The low-grade alkyl ether of polyhydric alcohol, such as the triethylene glycol monoethyl (or butyl) ether 2-pyrrolidone, a N-methyl-2-pyrrolidone, 1,3-dimethyl-2-imidazolidinone, Multifunctional compounds, such as sulphur-containing compounds, such as heterocycles, such as N-ethyl morpholine, a sulfolane, dimethyl sulfoxide, and 3-SURUHOREN, diacetone alcohol, and diethanolamine, and a urea derivative are mentioned. Polyhydric alcohol, such as a glycerol and a diethylene glycol, is [ among these ] more desirable. Moreover, the above-mentioned desiccation inhibitor may be used independently and may be used together two or more sorts. As for these desiccation inhibitors, it is desirable to contain below 50 mass % more than 1.0 mass % in ink.

[0071] As an osmosis accelerator used for this invention, alcohols, such as ethanol, isopropanol, butanol, II (Tori) ethylene-glycol-monobutyl-ether, 1, and 2-hexandiol, sodium lauryl sulfate and sodium oleate, a nonionic surfactant, etc. can be used. As for these, it is desirable for there to be sufficient effectiveness, if contained more than 10 mass % in ink, and to use it in a blot of printing and the range of an addition from which a paper omission (print through) is not started.

[0072] As an ultraviolet ray absorbent used in order to raise the shelf life of an image by this invention, JP,58-185677,A, A 61-190537 official report, JP,2-782,A, a 5-197075 official report, The benzotriazol system compound indicated by the 9-34057 official report etc., The benzophenone system compound indicated by JP,46-2784,A, JP,5-194483,A, U.S. Pat. No. 3214463, etc., The cinnamic acid system compound indicated by JP,48-30492,B, a 56-21141 official report, JP,10-88106,A, etc., JP,4-298503,A, a 8-53427 official report, a 8-239368 official report, The triazine compound indicated by the 10-182621 official report, the Patent Publication Heisei No. 501291 [ eight to ] official report, etc., The compound which absorbs the ultraviolet rays represented by the compound indicated by research disclosure No.24239 No., and a stilbene system and a benzoxazole system compound, and emits fluorescence, and the so-called fluorescent brightener can also be used.

[0073] As an antioxidant used in order to raise the shelf life of an image by this invention, the tenebrescence inhibitor of various kinds of organic systems and a metal complex system can be used. As an organic tenebrescence inhibitor, there are hydroquinone, alkoxy phenols, dialkoxy phenols, phenols, aniline, amines, indans, chromans, alkoxy aniline, and heterocycles, and there are a nickel complex, a zinc complex, etc. as a metal complex. more -- concrete -- the [ of research disclosure No.17643 ] -- I of VII thru/or J term -- said -- No.15162 -- said -- the 650-page left column of No.18716 -- said -- 527 pages of No.36544 -- said -- 872 pages of No.307105 -- said -- the compound indicated by the patent quoted by No.15162 and the compound contained in the general formula and the example of a compound of a typical compound which were indicated by 127 pages - 137 pages of JP,62-215272,A can be used.

[0074] As an antifungal agent used for this invention, sodium-dehydroacetate, sodium benzoate, sodium pyridine thione-1-oxide, ethyl-p-hydroxybenzoate ester, 1, and 2-bends iso thiazoline-3-ON, its salt, etc. are mentioned. As for these, it is desirable to do the 0.02-5.00 mass % activity of into ink. In addition,

these details are indicated by the "antifungal agent encyclopedia" (volume for Society for Antibacterial and Antifungal Agents, Japan encyclopedia edit committees) etc. Moreover, as a rust-proofer, an acid sulfite, a sodium thiosulfate, thioglycolic acid Amon, a diisopropyl ammonium nit light, pentaerythritol tetranitrate, a dicyclohexyl ammonium nit light, benzotriazol, etc. are mentioned, for example. As for these, it is desirable to do the 0.02-5.00 mass % activity of into ink.

[0075] Furthermore, in this invention, a polymer particle distribution object can be used in order to improve image shelf life and surface glossiness. These details are indicated by Japanese Patent Application No. No. 299465 [ 2000 to ]. [0076] with that desirable average grain size is 1 micrometer or less and desirable when using a polymer particle distribution object in this invention the solid content content of the polymer particle distribution object in ink being below 30 mass % more than 0.05 mass % As for pH regulator used for this invention, it is desirable to add so that it can be suitably used in respect of pH accommodation, distributed stability grant, etc. and pH may become 10.0 or less [ 4.5 or more ], and it is more desirable to add so that pH may become 10.0 or less [ 6 or more ]. As a pH regulator, an organic base, inorganic alkali, etc. are mentioned as a basic thing, and an organic acid, an inorganic acid, etc. are mentioned as an acid thing. Triethanolamine, diethanolamine, N-methyldiethanolamine, dimethylethanolamine, etc. are mentioned as an organic base. As inorganic alkali, the hydroxides (for example, a sodium hydroxide, a lithium hydroxide, a potassium hydroxide, etc.) of alkali metal, carbonates (for example, a sodium carbonate, a sodium hydrogencarbonate, etc.), ammonia, etc. are mentioned. Moreover, as an organic acid, an acetic acid, a propionic acid, trifluoroacetic acid, an alkyl sulfonic acid, etc. are mentioned. As an inorganic acid, a hydrochloric acid, a sulfuric acid, a phosphoric acid, etc. are mentioned.

[0077] As a surface-tension regulator used for this invention, Nonion, a cation, an anion, or an amphoteric surface active agent is mentioned. As an anion system surfactant, for example, a fatty-acid salt, an alkyl-sulfuric-acid ester salt, Alkylbenzene sulfonates, alkyl-naphthalenesulfonate, Dialkyl sulfo succinate, alkyl phosphate, a naphthalene sulfonic-acid formalin condensate, A polyoxyethylene alkyl-sulfuric-acid ester salt etc. can be mentioned. As an Nonion system surfactant Polyoxyethylene alkyl ether, polyoxyethylene alkyl aryl ether, Polyoxyethylene fatty acid ester, a sorbitan fatty acid ester, polyoxyethylene sorbitan fatty acid ester, polyoxyethylene alkylamine, a glycerine fatty acid ester, an oxyethylene oxypropylene block copolymer, etc. can be mentioned. SURFYNOLS (AirProducts&Chemicals) which is an acetylene series polyoxy ethylene oxide surfactant is also used preferably. Moreover, the amphoteric surface active agent of an amine-oxide mold like N and N-dimethyl-N-alkylamine oxide etc. is desirable. Furthermore, the \*\* (37) - (38) page of JP,59-157,636,A and the thing mentioned as a surfactant of research disclosure No.308119 (1989) publication can also be used. 20 or more mN/m 60 or less mN/m is 25 or more mN/m 45 or less mN/m desirable still more preferably without using the surface tension of the ink of this invention, using these.

[0078] The viscosity of the ink of this invention has 30 or less desirable mPa-s. Since it is more desirable to adjust to 20 more or less mPa-s, a viscosity controlling agent may be used in order to prepare viscosity. As a viscosity controlling agent, water-soluble polymers, the Nonion system surfactants, etc., such as celluloses and polyvinyl alcohol, are mentioned, for example. furthermore -- detailed -- "a viscosity preparation technique" (TECHNICAL INFORMATION INSTITUTE, 1999) -- it is indicated by Chapter 9, and the development trend of the KEMIKARUZU (98 enlargement)-ingredient for ink jet printers and "perspectives examination [ - ]" (CMC, 1997) 162-174 page.

[0079] Moreover, the \*\*\*\* chelating agent represented with this invention by a fluorine system, a silicone system compound, and EDTA as a dispersant and a distributed stabilizer as an above-mentioned cation, an anion, the various surfactants of the Nonion system, and a defoaming agent can be used if needed.

[0080] A recorded material with the well-known ink of this invention, i.e., a regular paper, and resin coat paper, for example, JP,8-169172,A, A 8-27693 official report, a 2-276670 official report, a 7-276789 official report, A 9-323475 official report, a 62-238783 official report, a 10-153989 official report, A 10-217473 official report, a 10-235995 official report, a 10-337947 official report, It can use for forming an image in the paper only for ink jets indicated by the 10-217597 official report, the 10-

337947 official report, etc., a film, electrophotography common paper, a textile, glass, a metal, pottery, etc.

[0081] The recording paper and the recording film which are used for using the ink constituent of this invention for below, and carrying out an ink jet print to it are explained. the recording paper and a recording film -- the base material to kick -- recycled pulp, such as mechanical pulp, such as chemical pulp, such as LBKP and NBKP, GP, PGW, RMP and TMP, CTMP, and CMP, CGP, and DIP, etc. -- since -- what mixed additives, such as the conventional well-known pigment, a binder, a sizing compound, a fixing agent, a cation agent, and a paper reinforcing agent, if needed, and was manufactured with various equipments, such as a Fortlinear paper machine and a cylinder machine, is usable. You may be any of a synthetic paper and a plastic film sheet besides these base materials, and, as for the thickness [ of 10 micrometers or more ] of 250 micrometers or less of a base material, and basis weight, two or less [ 2 or more g //m / 250 ] are desirable 10 g/m.

[0082] An ink absorbing layer and a back coat layer may be prepared as it is, and after preparing size press and an anchor coat layer with starch, polyvinyl alcohol, etc., an ink absorbing layer and a back coat layer may be prepared in a base material. Furthermore, calender equipments, such as a machine calender, TG calender, and a software calender, may perform flattening processing to a base material. In this invention, the paper and the plastic film which laminated both sides with polyolefine (an example, polyethylene, polystyrene, polyethylene terephthalate, polybutenes, and those copolymers) are more preferably used as a base material. It is desirable to add white pigments (an example, titanium oxide, zinc oxide) or a tint attachment color (an example, cobalt blue, ultramarine blue, oxidization neodum) in polyolefine polyolefine.

[0083] A pigment and an aquosity binder contain in the ink acceptance layer prepared on a base material. As a pigment, white pigments are good and organic pigments, such as inorganic white pigments, such as a calcium carbonate, a kaolin, talc, clay, diatomaceous earth, synthetic amorphous silica, aluminum silicate, a magnesium silicate, a calcium silicate, an aluminum hydroxide, an alumina, a lithopone, a zeolite, a barium sulfate, a calcium sulfate, a titanium dioxide, zinc sulfide, and zinc carbonate, a styrene system pigment, an acrylic pigment, a urea-resin, and melamine resin, etc. are mentioned as white pigments. As white pigments contained in an ink absorbing layer, a porous inorganic pigment is good and synthetic amorphous silica especially with a large pore area etc. is suitable. Although all of the water silicic acid obtained according to the silicic anhydride obtained according to a dry process and wet process of synthetic amorphous silica are usable, it is desirable to use especially water silicic acid. These pigments may use two or more sorts together.

[0084] As an aquosity binder contained in an ink absorbing layer, water-dispersion macromolecules, such as water soluble polymers, such as polyvinyl alcohol, silanol denaturation polyvinyl alcohol, starch, cation-ized starch, casein, gelatin, a carboxymethyl cellulose, hydroxyethyl cellulose, a polyvinyl pyrrolidone, polyalkylene oxide, and a polyalkylene oxide derivative, a styrene butadiene latex, and an acrylic emulsion, etc. are mentioned. these aquosity binders are independent -- or two or more sorts can be used together and it can use. Especially in this invention, polyvinyl alcohol and silanol denaturation polyvinyl alcohol are suitable also in these in respect of the adhesion over a pigment, and the peeling resistance of an ink absorbing layer.

[0085] An ink absorbing layer can contain the additive of a mordant, a deck-watertight-luminaire-ized agent, a light-fast improver, a surfactant, a hardening agent, and others other than a pigment and an aquosity binder. As for the mordant added all over an ink absorbing layer, immobilizing is desirable. For that purpose, a polymer mordant is used preferably. About a polymer mordant, JP,48-28325,A, 54-74430, 54-124726, 55-22766, 55-142339, 60-23850, 60-23851, 60-23852, 60-23853, 60-57836, 60-60643, 60-118834, 60-122940, 60-122941, Each official report of 60-122942, 60-235134, and JP,1-161236,A, a U.S. Pat. No. 2484430 number -- said -- No. 2548564 -- said -- No. 3148061 -- said -- No. 3309690 -- said -- No. 4115124 -- said -- No. 4124386 -- said -- No. 4193800 -- said -- No. 4273853 -- said -- No. 4282305 -- said -- each description of No. 4450224 has a publication. Especially the television ingredient containing the polymer mordant of a 212-215-page publication of JP,1-161236,A is desirable. If a polymer mordant given [ this ] in an official report is used, the image of the outstanding

image quality will be obtained and the lightfastness of an image will be improved.

[0086] The deck-watertight-luminaire-ized agent is effective in deck-watertight-luminaire-izing of an image, and its cation resin is desirable especially as these deck-watertight-luminaire-ized agents. As such cation resin, polyamide polyamine epichlorohydrin, polyethyleneimine, a polyamine sulfone, a dimethyl diaryl ammoniumchloride polymerization object, cation polyacrylamide, colloidal silica, etc. are mentioned, and polyamide polyamine epichlorohydrin is suitable especially in these cation resin. Below 15 mass % of the content of these cation resin is desirable more than 1 mass % to the total solids of an ink absorbing layer, and it is especially desirable that it is below 10 mass % more than 3 mass %.

[0087] As a light-fast improver, a zinc sulfate, a zinc oxide, a hindered amine system anti-oxidant, the ultraviolet ray absorbent of a benzophenone system or a benzotriazol system, etc. are mentioned. A zinc sulfate is suitable especially in these. A surface active agent functions as a spreading assistant, a detachability amelioration agent, a slide nature amelioration agent, or an antistatic agent. About a surfactant, each official report of JP,62-173463,A and 62-183457 has a publication. An organic fluoro compound may be used instead of a surfactant. As for an organic fluoro compound, it is desirable that it is hydrophobicity. A fluorochemical surfactant, an oil-like fluorine system compound (an example, fluorine oil), and solid-state-like fluorine compound resin (an example, tetrafluoroethylene resin) are contained in the example of an organic fluoro compound. About an organic fluoro compound, each official report of JP,57-9053,B (the 8-17th columns), JP,61-20994,A, and 62-135826 has a publication.

[0088] As a hardening agent, the ingredient indicated by 222 pages of JP,1-161236,A can be used.

[0089] As an additive added by other ink absorbing layers, a pigment agent, a thickener, a defoaming agent, a color, a fluorescent brightener, antiseptics, pH regulator, a mat agent, a hardening agent, etc. are mentioned. In addition, one layer or two-layer are sufficient as an ink absorbing layer.

[0090] A back coat layer can also be prepared in the detail paper and a recording film, and the component of white pigments, an aqueosity binder, and others is mentioned to them as a component which can be added in this layer. As white pigments contained in a back coat layer For example, precipitated calcium carbonate, whiting, a kaolin, talc, A calcium sulfate, a barium sulfate, a titanium dioxide, a zinc oxide, zinc sulfide, Zinc carbonate, a satin white, aluminum silicate, the diatom earth, a calcium silicate, A magnesium silicate, synthetic amorphous silica, colloidal silica, a colloidal alumina, Quasi-boehmite, an aluminum hydroxide, an alumina, a lithopone, a zeolite, Organic pigments, such as white inorganic pigments, such as hydrated halloysite, a magnesium carbonate, and a magnesium hydroxide, a styrene system plastics pigment, an acrylic plastics pigment, polyethylene, a microcapsule, a urea-resin, and melamine resin, etc. are mentioned.

[0091] As an aqueosity binder contained in a back coat layer, water-dispersion macromolecules, such as water soluble polymers, such as styrene / maleate copolymer, styrene / acrylate copolymer, polyvinyl alcohol, silanol denaturation polyvinyl alcohol, starch, cation-ized starch, casein, gelatin, a carboxymethyl cellulose, hydroxyethyl cellulose, and a polyvinyl pyrrolidone, a styrene butadiene latex, and an acrylic emulsion, etc. are mentioned. As a component of others which are contained in a back coat layer, a defoaming agent, foam suppressor, a color, a fluorescent brightener, antiseptics, a deck-watertight-luminaire-ized agent, etc. are mentioned.

[0092] Polymeric latex may be added in the configuration layer (a back layer is included) of the ink jet detail paper and a recording film. Polymeric latex is used for the object of film physical-properties amelioration like dimension stabilization, curl prevention, adhesion prevention, and crack prevention of the film. About polymeric latex, each official report of JP,62-245258,A, 62-1316648, and 62-110066 has a publication. If polymeric latex (40 degrees C or less) with a low glass transition temperature is added in the layer containing a mordant, the crack and curl of a layer can be prevented. Moreover, curl can be prevented even if it adds polymeric latex with a high glass transition temperature in a back layer.

[0093] A limit does not have the ink constituent of this invention in the recording method of an ink jet. The charge control system which makes ink breathe out using a well-known method, for example, the electrostatic induction force, The drop method using the oscillating pressure of a piezo-electric element on demand (pressure pulse method), It is used for the thermal ink jet (bubble jet (trademark)) method which heats the sound ink jet method which an electrical signal is changed [ method ] into a sound

beam, and ink is irradiated [ method ], and makes ink breathe out using radiation pressure, and ink, forms air bubbles, and uses the produced pressure. The method which injects much ink with low concentration called photograph ink by the small volume, the method which improves image quality using two or more ink in which concentration differs by the same hue substantially, and the method using transparent and colorless ink are contained in an ink jet recording method.

[0094]

[Example] Hereafter, although an example explains this invention, this invention is not limited to this.

[0095] After adding deionized water to the component of the example 1 following and considering as 1l., it agitated for 1 hour, heating at 30-40 degrees C. It prepared to pH=9 in the KOH water solution (10 mol/l) after that, and filtration under reduced pressure was carried out by the microfilter of 0.25 micrometers of average apertures, and the liquid ink for yellow was prepared.

(Liquid ink presentation for yellow)

A yellow color (1-1) 14.7 g/l Diethylene glycol 160g/l. Glycerol 150 g/l Triethylene glycol monobutyl ether 130 g/l (water soluble solvent of a general formula (I))

Triethanolamine 0.8 g/l Benzotriazol 0.06 g/l PROXEL XL2 2.5 g/l SAFI Norian 465 10 g/l [0096] By furthermore changing a coloring agent and an additive, cyanogen ink, light Magenta ink, Magenta ink, light cyanogen ink, and black ink were prepared, and the ink set 101 shown in a table 1 was produced.

[0097]

[A table 1]

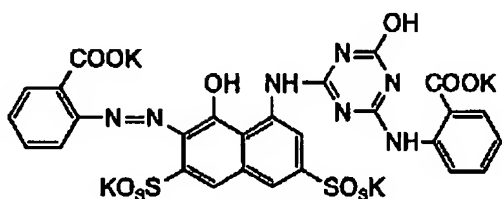
	ライト マゼンタ	マゼンタ	ライト シアン	シアン	イエロー	ブラック
染料 (g/l)	A-1 7.5	A-1 30.0	A-2 8.75	A-2 35.0	1-1 14.7	A-5 20.0 A-6 20.0 A-7 20.0 A-3 21.0
ジエチレングリコール (g/l)	50	112	130	200	160	20
尿素 (g/l)	37	46	—	—	—	—
グリセリン (g/l)	130	130	150	180	150	120
トリエチレングリコール モノアルキルエーテル (g/l)	130	140	130	140	130	—
ジエチレングリコール モノアルキルエーテル (g/l)	—	—	—	—	—	230
2-ヒドロキシ (g/l)	—	—	—	—	—	81
サフィノール 465 (g/l)	10	10	10	10	10	—
サフィノール STG (g/l)	—	—	—	—	—	8.5
トリエタノールアミン (g/l)	6.9	7.0	6.0	6.7	0.8	18.9
ベンゾトリアゾール (g/l)	0.08	0.07	0.08	0.08	0.06	0.06
Proxel XL2 (g/l)	8.5	2.5	1.8	2.0	2.5	1.8
脱イオン水を加え、1リッターとする。						

[0098]

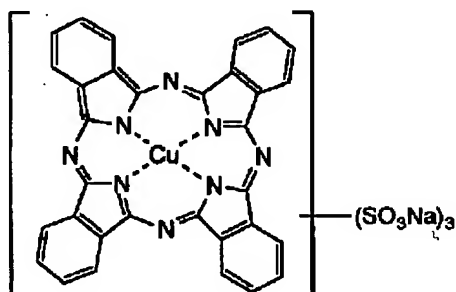
[Formula 27]



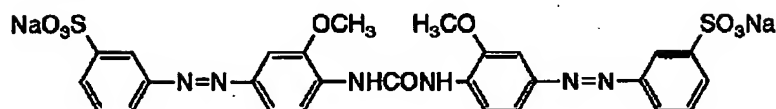
A-1



A-2



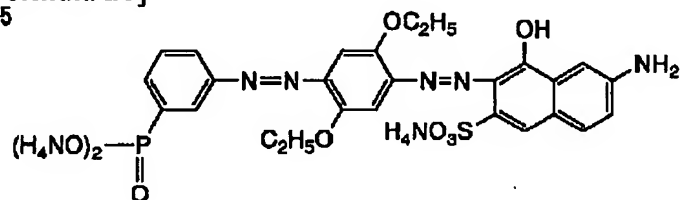
A-3



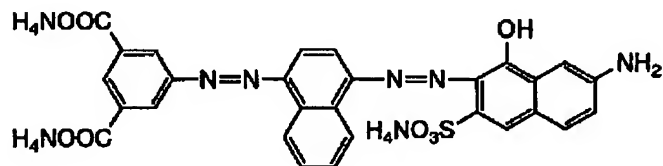
[0099]

[Formula 28]

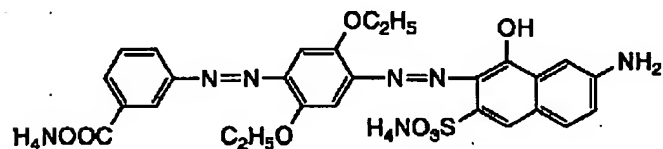
A-5



A-6



A-7



[0100] A color and the triethylene glycol monobutyl ether were similarly changed according to a table 2, and the ink sets 102-108 were produced. It was made for all the additions of the triethylene glycol monobutyl ether and the organic solvent of the alternative to become 13.0 mass %. The ink set 109 for a comparison was produced by the ink set 101 and this formula except having changed the color kind into A-3. Moreover, the ink set 110 for a comparison was produced by the ink set 101 and this formula except having removed the triethylene glycol monobutyl ether.

[0101] Next, these ink sets 101-110 were put in the cartridge of ink jet printer PM670C (product made



from EPSON), the image was printed in this opportunity to the ink jet paper photograph glossy paper EX by Fuji Photo Film Co., Ltd., and the following assessment was performed.

[0102] 1) A4 after setting a regurgitation stability cartridge to a printer and checking projection of the ink from all nozzles 20 sheets were outputted and the following criteria estimated.

A: Turbulence-less B of printing from printing initiation to termination : those of printing from

C:printing initiation which an output with turbulence of printing generates to termination with

turbulence [0103] 2) The blot \*\* yellow of a thin line, a Magenta, cyanogen, and the thin line pattern of black were printed, and viewing estimated.

O : -blot-less \*\*: -- decipherment is possible although blurred somewhat -- after printing yellow ink to solid one about decipherment impossible \*\* black by x:blot, the thin line of black was printed and assessment of the blot by contact of two colors was also performed.

O : -blot-less \*\*: -- decipherment is possible although blurred somewhat -- decipherment by x:blot is impossible -- [0104] 3) Time amount until it will carry the recording paper-ed and the same paper on the solid image printing sample of rate-of-drying yellow and will not carry out a set-off from immediately after a 1-second presser foot and printing was measured. Time amount until the whole printing sample will not carry out a set-off thoroughly evaluated [ less than 5 seconds ] B and 30 seconds or more for 30 seconds as C from A and 5 seconds.

[0105] 4) Image shelf life (light fastness and heat robustness)

The solid image printing sample of yellow was produced and the following assessment was performed.

\*\* It is the image concentration Ci immediately after printing X-rite After measuring in 310 and irradiating xenon light (85,000 luxs) on the 10th at an image using the weather meter by the atlas company, the image concentration Cf was measured again and it evaluated in quest of color survival-rate  $Cf/Ci \times 100$ . the rate of a color after-image -- reflection density -- 1 and 1. -- three points of 5 and 2 estimated and less than 70% of case was set to C for the case where A and two points are less than 70% about the case where a color survival rate is 70% or more, by B and all concentration with any concentration. \*\* It is concentration before and after saving a sample for ten days under the condition of 80-degree-C15%RH about heat robustness X-rite It measured in 310 and evaluated in quest of the color survival rate. the rate of a color after-image -- reflection density -- 1 and 1. -- three points of 5 and 2 estimated and less than 90% of case was set to C for the case where A and two points are less than 90% about the case where a color survival rate is 90% or more, by B and all concentration with any concentration.

[0106] 5) Under the intermittent regurgitation stability temperature of 15 degrees C, and 20% environment of humidity, after performing party printing using an ink constituent, fixed time amount printing was stopped and printing was resumed after that. The existence of the dot omission of the 1st dot of the beginning at the time of resumption of printing or flight deflection was observed. The quiescent time until a dot omission or flight deflection is observed set A and less than [ more than 10 second 60 second ] to B, and set less than 10 seconds to C for 60 seconds or more. The obtained result is shown in a table 2.

[0107]

[A table 2]

インク セット	染料	水溶性 有機溶 剤	吐出 安定 性	光堅 牢性	熱堅 牢性	乾燥 性	細線の 滲み①	細線の 滲み②	間欠吐出 安定性	備考
101	1-1	TEGm BE	A	A	A	A	○	○	A	本発明
102	1-2	TEGm BE	A	A	A	A	○	○	A	本発明
103	1-5	DEGm BE	A	A	A	A	○	○	A	本発明
104	2-1	DEGm BE	A	A	A	A	○	○	A	本発明
105	2-3	DEGm ME	A	A	A	A	○	○	A	本発明
106	2-6	DEGm ME	A	A	A	A	○	○	A	本発明
107	3-1	TEGm ME	A	A	A	A	○	○	A	本発明
108	3-3	TEGm ME	A	A	A	A	○	○	A	本発明
109	A-3	TEGm BE	A	B	B	B	△	△	B	比較
110	1-1	—	B	A	A	B	△	△	B	比較

TEGmBE：トリエチレングリコールモノブチルエーテル

DEGmBE：ジエチレングリコールモノブチルエーテル

DEGmME：ジエチレングリコールモノメチルエーテル

TEGmME：トリエチレングリコールモノメチルエーテル

[0108] The following things are clear from the result shown in a table 2. It turns out that the ink constituent (ink sets 101-108) of this invention is excellent in regurgitation stability, weatherability (light and heat robustness), and drying all, and the image which a blot of a thin line does not have, either is obtained. The ink constituent (ink set 109) which, on the other hand, does not use the color expressed with general formula (1) - (3) is inferior to weatherability (light and heat robustness), drying, a blot, and intermittent regurgitation stability, although regurgitation stability is good. Although the ink constituent (ink set 110) which does not use the water-soluble organic solvent shown by the general formula (I) is excellent in weatherability, it is inferior to regurgitation stability, drying, a blot, and intermittent regurgitation stability.

[0109]

[Effect of the Invention] Advantageous water color ink is used for the ink constituent of this invention from points, such as handling nature, an odor, and safety, regurgitation stability and its intermittent regurgitation stability are high, it is excellent in a hue, weatherability, and image quality, and its ink rate of drying in the record paper is quick. Therefore, it excels as an object for ink jet record. Since the above-mentioned ink constituent is used for the ink jet record approach of this invention, it is the radical of the ink rate of drying in the good record paper, regurgitation stability, and intermittent regurgitation stability, and can give the outstanding hue, weatherability, and a high-definition image.

[Translation done.]